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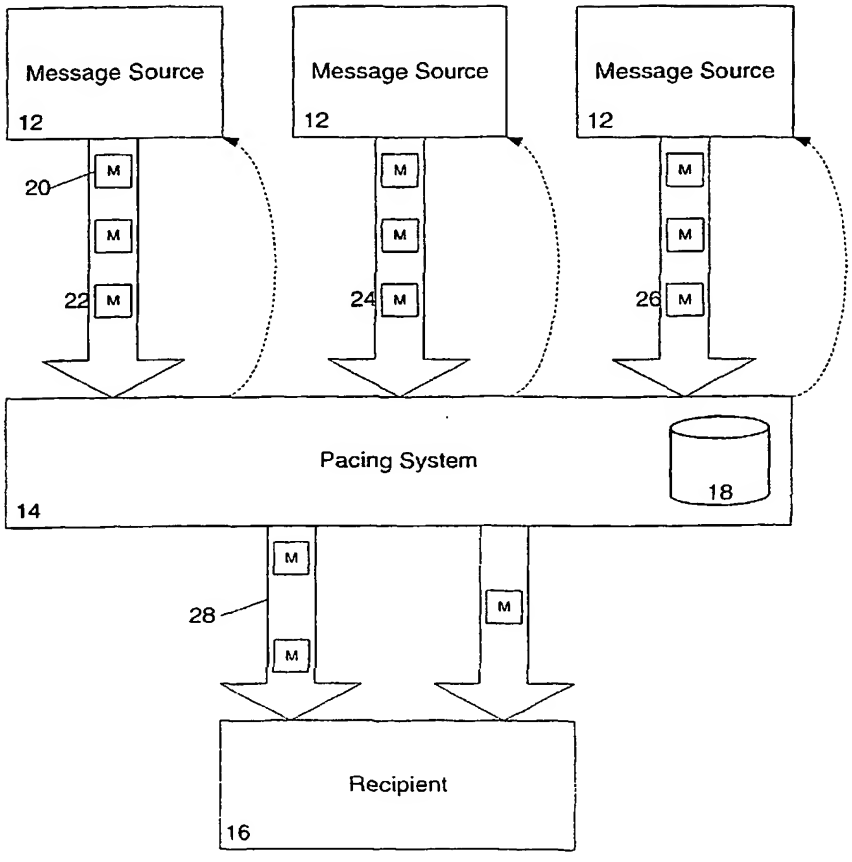
(54) Title: METHOD AND SYSTEM FOR MANAGING MESSAGE PACING



(57) Abstract: A system for managing message volume and timing, which permits messages from multiple sources to be spaced apart over time, with t he pacing controlled in part by the type or priority of the message. The system permits the volume of messages to be reduced by aggregating messages according to a set of rules and by discarding or delaying messages that are sufficiently similar and sent too close together. In addition, the system allows message sources to be notified when a recipient has not received a message within a designated time period. The system can be implemented as a centralized pacing system or through use of a data storage system accessible by the message sources.

METHOD AND SYSTEM FOR MANAGING MESSAGE PACING

Field of the Invention

This invention relates to methods and systems for managing online and other communications.

Background of the Invention

With the growth of use of the Internet, more and more people have access to e-mail, and more and more entities use e-mail to communicate with customers, potential customers, or other people of interest. In, for example, a marketing context, companies periodically send e-mails to customers with new product information, special offers, company news, or other information.

As a result, recipients find themselves receiving more e-mails than they want to read. Recipients may get angry at the sender, may "opt-out" of further mailings (if that option is available), or may simply stop reading the mailings. Thus, the benefits from sending mailings are reduced and recipients may not get information they otherwise would have found useful.

Summary of the Invention

According to the present invention, message volume and timing is managed, preferably for both messages from a single message source and messages from multiple, independent message sources. In one embodiment, a centralized message pacing system is used, which regulates when messages are sent to recipients. In another embodiment, each message source uses a commonly-accessible data repository to determine when it sends messages, so that the timing of messages from each message source is coordinated.

The invention permits messages to be spaced at regular or other periods, depending on the type of message, its priority, or other factors. In addition, the invention permits messages to be combined in accordance with a set of rules, so as to reduce the number of separate messages that each recipient receives. Also, the invention permits the pacing of messages to be monitored, so that if a message is not sent to a recipient within a specified time period, one or more message sources are notified. Either the sender or the recipient can have control over the message pacing, both with respect to the timing of messages and the types of messages.

The invention is applicable generally to various types of communications channels. In a preferred embodiment, the invention is used in conjunction with a marketing system, such as the system described in commonly-assigned patent application number 09/621,913, filed on the same day as this application, entitled "Method and System for Facilitating Marketing Dialogues," which is incorporated herein by reference.

Brief Description of the Drawings

Figure 1 is a block diagram of a system according to an embodiment of the present invention.

Figure 2 is a representation of a structure for use with an embodiment of the present invention.

Figure 3 is a block diagram of a system according to an embodiment of the present invention.

Figure 4 is a flow diagram of steps performed according to an embodiment of the present invention.

Figure 5 is a flow diagram of steps performed according to an embodiment of the present invention.

Figure 6 is a flow diagram of steps performed according to an embodiment of the present invention.

Figure 7 is a representation of a structure for use with an embodiment of the present invention.

Detailed Description of Preferred Embodiments

Referring to Figure 1, a network includes various message sources 12, a pacing system 14, and a recipient 16. Although only a single recipient is shown, for clarity, it is understood that the pacing system may be applied to multiple recipients. Pacing system 14 includes a data storage system 18, such as a database system, that is used to store pacing and message information. Messages 20 intended for recipient 16 (and possibly for other recipients as well) are sent from message sources 12 over communication paths 22, 24, and 26 to pacing system 14. Although shown as separate communication paths, paths 22, 24, and 26 could all be part of a single network, such as the Internet. The communication paths also could involve wide area networks (WANs), local area networks (LANs), dedicated communication paths, or any other communication channel. Or, the message sources 12 and

pacing system 14 could be components on the same system, using direct procedure calls or inter-process communications.

Pacing system 14 forwards messages 20 on to recipient 16 over one or more channels 28 according to a pacing algorithm. For example, messages may be delivered no more than once every *n* time units (such as once every 7 days). The value of *n* can be different for each recipient, and can vary for different types of messages or different delivery channels. In a preferred embodiment, one channel 28 is an e-mail channel and a second channel is a phone channel. Facsimiles, pagers, regular mail, and any other communication channel could also be included.

Preferably, as shown in Figure 2, each message 20 that pacing system 14 receives has, in addition to its content 120 (including the identity of the recipient, the recipient's address, and the message to be delivered), a set of delivery properties, including: an expiration date 102 and a priority 104. After the expiration date, the message will be discarded if it has not yet been delivered. Optionally, some messages can have no expiration date. In a preferred embodiment, there are three levels of priority, high, normal, and low, with normal being the default value. Generally, higher priority messages are delivered before lower priority messages. However, the priority can be treated as one factor, along with the expiration date, in determining which message to deliver. Some messages also may be marked as "always deliver," (field 106 in Figure 2) indicating that it should be delivered before its expiration date, even if that would be sooner than provided by the pacing algorithm. For example, if messages are to be delivered no more than once every 7 days, and an "always deliver" message would expire 4 days after the last message was delivered, then it would be delivered after 4 days. Preferably, the 7 day period would be restarted after the "always deliver" message is sent. Optionally, messages can be marked as "urgent" (field 108) and delivered immediately, regardless of when the last message was delivered. An "urgent" message may or may not re-set the delivery timer.

According to one embodiment, pacing system 14 will accept each message it receives from each message source 12. Other than with "always deliver" or "urgent" messages, pacing system 14 then waits until *n* time units after it sent the last message to recipient 16. Pacing system 14 then considers all messages that have not been delivered and have not expired. The message properties are then used to select a message to deliver. For example, pacing system 14 could select the message with the shortest expiration date, using priority as

a tie-breaker. Or, pacing system 14 could select the message with the highest priority, using expiration date as a tie-breaker.

Also, combinations of these and other properties of the message can be considered. For example, the recipient could designate certain senders as higher priority than other senders. In addition, pacing system 14 can treat message channels individually or in combinations. Thus, messages sent by e-mail may have no effect on the timing of telephone calls (and vice versa), messages sent by e-mail and telephone calls could be treated together for timing (that is, no call is made or e-mail sent until *n* days after the last call or e-mail), or some combination of these extremes could be used. For example, calls could be separated by at least 14 days and e-mails could be separated by at least 7 days, with the added requirements that an e-mail cannot be sent for at least 3 days after a call and a call cannot be made for at least 4 days after an e-mail. As another example, message timing can be based at least in part on categorized message types.

Instead of a centralized pacing system, a central pacing storage system 214 can be used, as shown in Figure 3. In this embodiment, each message source 212 sends messages directly to recipient 216, through channel 222 or channel 224. For example, channel 222 could be an e-mail channel and channel 224 a phone channel. Although only two channels are shown, it is understood that more channels could be used. In addition, each message source 212 is connected to pacing storage system 214 over network 226. Of course, it is understood that network 226 and one of the channels (such as e-mail channel 222) could overlap (if, for example, both use the Internet). Pacing storage system 214 maintains for each recipient 216 message managing information, such as a record with the value of *n* (the timing between messages) and the date the last message was sent to that recipient. If the value of *n* is global for all recipients (or a group of recipients), then it is understood that its value may be maintained for each recipient without storing separate instances of the value for each recipient. Where appropriate, pacing storage system 214 may maintain records of the date the last message was sent on each channel or in each category.

When a message source 212 is ready to send a message to a particular recipient, the message source checks with pacing storage system 214 to determine when the last message was sent and the timing interval *n*. Or, message source 212 may make a request for whether a message can be sent to the recipient, in which case pacing storage system 214 would calculate whether the current date is greater than the date the last message was sent plus the timing interval, and respond to message source 212. If the new message can be sent, message

source 212 sends the message and informs pacing storage system 214, so that the date of the last message can be updated. If the current time is less than the timing interval since the last message was sent, then message source implements a pacing algorithm to determine when to try again. For example, the message source could wait until the end of the interval and then check again. Or, if this is an "always deliver" message, the message source would wait until the message is about to expire and then send the message.

The message gap can vary based on the priority of the message. For example, the message gap for a high priority message could be 3 days (that is, 3 days since the last contact of any priority), with the message gap for a normal priority message 7 days, and the message for a low priority message 14 days. Also, the message gap can vary based on the prior message. So, for example, a low priority message can be sent 7 days after a high or normal priority message, but not for 14 days after a low priority message.

In a preferred embodiment, pacing system 14 uses storage system 18 to keep track of the message gap or gaps (which can be a global value, or personalized for each recipient), and the following information for each recipient: T_{last} (the date of the last contact, which could be never); T_{next} (the earliest date at which the recipient can be contacted); and S_{msgs} (the set of messages to be sent to the recipient). For each message, pacing system 14 records the arrival date, so that messages with the same priority and expiration date can be processed according to a "first-come, first-served" algorithm.

One way for the pacing system to decide, as each new message arrives, whether it should be sent immediately or placed in the data store, is shown in Figure 4. A message arrives at step 310. Pacing system 14 then determines (step 312) whether the message is marked "urgent." If so, the message is sent (step 314) and the process ends (step 316). It is assumed, with this example, that urgent messages do not cause the timer gap to be reset. If the message had not been marked urgent, the pacing system looks up the last contacted date (T_{last}), at step 318, and determines if the recipient had previously been contacted (step 320). If the recipient had not previously been contacted, the message is sent (step 322). The pacing system then updates the last contacted date (step 324), looks up the message gap (step 326), and updates the next contact date (T_{next}) at step 328. The process then ends (step 330). However, if the pacing system determines at step 320 that the recipient had been contacted, then the message is inserted into the database by updating S_{msgs} (step 332). The process then ends (step 334). Alternatively, the lookup message gap and update next contact date steps (steps 326 and 328) can be performed if the recipient previously had been contacted. In this

case, those steps preferably would be performed after inserting the message in the database at step 332. With this alternative, the pacing system would not "wake up" (as discussed below) unless a message is waiting in the database.

This process also can be implemented in a number of other ways. For example, the system could let the next contact date have a value of "immediately" when the last message gap has expired (or no messages previously have been sent), and use that value at step 318 (instead of the last contacted date) to determine whether a message should be sent. Similarly, the system could check whether the next contact date is prior to the current time. Or, a separate flag (such as a "window open" flag) could be tested at step 320 to determine whether a message can be sent immediately.

Using timers or periodic queries, pacing system 14 "wakes up" when the next contact date arrives. The pacing system then determines which message to send, then resets the message dates.

One way to implement this process is shown in Figure 5. At step 410 the process begins. The pacing system first deletes expired messages, at step 412. Then, the pacing determines whether any active messages remain (step 414). If not, then the system deletes the last contacted date (step 416), so that when a new message arrives it will be sent immediately. The process then ends (step 418). If, at step 414, the system determined that one or more active messages remained, the messages preferably are sorted by priority, expiration date, and arrival date (step 420). Alternatively, other selection processes can be used. After sorting the messages, the system sends the highest priority message (step 422). The system then updates the last contacted date T_{last} (step 424), deletes the sent message from the set S_{msgs} (step 426), and updates the next contact date (T_{next}) at step 428. The process then ends (step 430). If, instead of checking (at step 320 of Figure 4) the last contacted date, the system checks for whether the window is open, then step 416 could be omitted. Or, if at step 320 the system checks the next contact date for an "immediate" value or value in the past, then step 416 would be replaced with updating the next contact date to the immediate value, or omitted.

Alternatively, with either of the above systems, to select which message is sent (and when the message is sent) the system (the pacing system, where a centralized pacing system is used, or each message source where a centralized storage system is used) could assign delay times based on the message properties and a random number. In this alternative, the system sends messages during an open window period. The window is open if the last

message was sent at least *n* time units previously, where *n* is the message gap. The message gap can be the same for all recipients or can vary by recipient. Otherwise, the window is closed and the message is delayed until a point in time shortly after the window is expected to open. If the window is still closed after the delay, the process repeats.

With the use of an open window period, because each message is processed individually, the length of each message delay is staggered, so that messages with a higher priority "wake up" before messages of lower priority. For messages with equal priority, the delay is adjusted so that those with shorter expiration dates wake up before messages with longer expiration dates. For messages with the same priority and expiration date, a random factor is used to ensure they do not wake up at the same time. In a system with a single engine or processor executing the programs for sending messages, it may also be the case that only one message is processed at a time, which will lead to one message being processed first, and the other message then waiting until the window re-opens. Preferably, the wake up time (T_{wake}) is determined using the following algorithm:

$$T_{wake} = T_{open} + [\text{priority weight}] + 5\text{min} * \min(20, \text{num_weeks}[T_{exp} - T_{open}]) + \text{ran}(0\text{-}5\text{min})$$

where T_{open} is the time that the window opens, calculated as:

$$T_{open} = (\text{last contacted date} + \text{message gap})$$

and where T_{exp} is the expiration time (that is, the expiration date of the message) and where [priority weight] is 0 hours for high priority messages, 2 hours for normal priority messages, and 4 hours for low priority messages. Alternatively, a simpler algorithm employing only some of these factors, could be used, or a different algorithm could be used. Also, the algorithm can consider the message channel as well (as discussed above), so that messages in one channel (such as e-mail) are considered independently of messages in another channel (such as phone calls or facsimiles), or so that prior messages in one channel affect when messages can be sent through another channel.

One way to implement this selection process is shown in Figure 6. The process begins at step 510, when a message arrives or a message wakes up. At step 512, the system determines if a message is marked "urgent." If it is, the message is sent (step 514) and the process ends (step 516). If, at step 512, the message had not been marked urgent, the system determines (step 518) if the message has expired. If so, the process ends (step 520). If not, the system looks up the last contacted date (step 522) and the message gap for this recipient (step 524). The system then checks (step 526) whether the current date is greater than the sum of the last contacted date plus the message gap. If so (or if the recipient had not

previously been contacted), then the message is sent (step 528). The system then updates the last contacted date (step 530) and ends (step 532). If the current date was not greater than the sum of the last contacted date plus the message gap (that is, the window is closed), then the system waits (step 534) until the window opens, then returns to step 518. This ensures that the current message will be processed before another message that wakes up while the system waits. The window could be closed, for example, because another message had been sent since the wake-up time for that message had been calculated. Alternatively, if the window was closed, the message could go back to sleep for a specified time period and the process could end, which could mean that another message will be processed before it if the other message wakes up first.

In addition to determining the timing of messages, in a preferred embodiment the pacing system can be used to manage message volume. Message volume management mechanisms include aggregating messages, discarding similar messages, and stimulating messages. Thus, volume management can be used both to reduce and to increase the number of messages, depending on the message volume.

For aggregating messages, as shown in Figure 7, messages can be assigned the additional properties of type 610 and topics 612. A message type indicates the kind of content contained in the message, such as informational, advertisement, or cross-sell. The message topics indicate the subjects that the message contains, such as the type of product to which an offer relates. The message topics also can refer to the source of a product or offer, where information or products from different sources may be offered.

The pacing system, in this example, still accepts messages from the message sources. Given a pool of messages, pacing system 14 can select a subset of the undelivered messages and combine them into a single message to be delivered at one time. To do this, pacing system 14 is configured with a set of rules and templates for combining messages. The rules could be, for example, "no more than two advertisements in a message," "at least one informational item in a message," and rules preventing certain message topics from being combined in a single message. For example, a rule might ensure that information about a new humidifier is not sent along with information about a new dehumidifier. These rules would work with the selection rule to determine which messages are combined into the single message. The templates describe how to format the messages. For example, informational items are placed on the left side and advertisements are placed on the right side, or two advertisements must be separated by some other type.

In addition, messages can be identified as carriers or tag-alongs (field 614 in Figure 7). Tag-along messages are placed in a priority queue or queues. When a carrier message is about to be sent, the message source checks the tag-along queue(s) and selects one or more items to add to the carrier message in accordance with a set of rules. The rules could, for example, limit the number of tag-alongs per message or the types of tag-alongs that can be combined in a single message, and could prevent tag-along messages with certain topics from being combined with certain carrier messages or tag-along messages of specified types or topics. The templates, in this case, may describe how to format the carrier message relative to the tag-along messages, and the tag-along messages relative to each other.

Optionally, messages also can identify the channel or channels (field 616) over which a message can be sent. The channel identifier 616 may be used, for example, to determine which messages to aggregate, so that the pacing system will aggregate messages being sent over the same channel. Also, the channel identifier 616 can be used so that the pacing system can choose one of several channels to use for message delivery. This may apply, for example, to optimize aggregation or to minimize the delay before a message is sent to a particular recipient. In one embodiment, channel identifier 616 is used to determine the channel by which to send a message when the delay periods over different channels are different. Optionally, where multiple channels are identified, other fields (such as priority field 604) can have an entry for each channel.

Where recipients have the ability to "opt-out" of receiving certain messages or it may otherwise be determined that a message should not be sent to a recipient during the delay period before a message is forwarded to the recipient, messages also may be assigned a permission check property 618. Permission check property 618 can be used, similarly to expiration date property 602, to determine when a message should not be sent. For example, in a centralized pacing system, if permission check property 618 is true, the pacing system checks whether a participant has opted out of a message before sending the message on to the recipient.

For discarding similar messages, the pacing system can apply a set of precedence rules. For example, the pacing system can have a rule that a message is discarded if another message of the same or a similar type (or on the same or a similar topic) was delivered within a particular time period. Alternatively, this type of rule could be used to delay a message, so that two messages of the same or similar types (or topics) are not sent within a specified time period.

While the preceding volume management functions reduce the volume of messages (or the volume of similar messages), it may also be desirable to stimulate the sending of messages when a specified time frame has elapsed without any messages being sent. Thus, in addition to storing a minimum period between messages, the pacing system can store an upper threshold period. If the upper threshold period is exceeded without a message being sent, the pacing system can notify the message sources.

Although some of the message volume management functions have been described in terms of a central pacing system and some in terms of a pacing storage system, it should be understood that the functions could be implemented with either type of system or a combination of the two.

While there have been shown and described examples of the present invention, it will be readily apparent to those skilled in the art that various changes and modifications may be made therein without departing from the scope of the invention as defined by the following claims. For example, the invention can be implemented with a push system, a pull system, an inbox or outbox system, or any other message delivery system. Also, timing periods could be adjusted so that, for example, all e-mails are sent on a particular day of the week or month, or low priority messages are sent only on a particular day. Furthermore, some functions of a central pacing system can be combined with some functions of a pacing storage system (allowing, for example, some messages to be sent directly from the message sources to the recipients) as part of an overall pacing system. Moreover, while some message delivery functions or properties have been described in terms of global properties and some in terms of personal properties, the delivery algorithms can apply the rules globally, at an individual level, or at a group level as desired. Accordingly, the invention is limited only by the following claims and equivalents thereto.

What is claimed is:

Claims

1. A method for managing messages comprising the steps of:

receiving one or more messages intended for a recipient from one or more sources;

storing one or more delivery properties of each of the messages; and

spacing delivery of the messages to the recipient according to a pacing algorithm that considers the delivery properties.

2. The method of claim 1, wherein the step of storing one or more delivery properties includes storing a priority of each of the messages.

3. The method of claim 2, wherein the step of storing one or more delivery properties further includes storing an expiration date of each of the messages.

4. The method of claim 1, further comprising the step of combining messages intended for a recipient into a single message.

5. The method of claim 4, wherein the step of combining messages includes the step of applying a set of rules for determining which messages to combine.

6. The method of claim 5, wherein the step of combining messages further includes the step of applying a template to determine how to format the combined messages.

7. The method of claim 1, further comprising the step of discarding a first of the messages for one of the intended recipients based on the delivery properties of a message previously sent to the intended recipient.

8. The method of claim 1, further comprising the step of notifying one or more of the sources if a message has not been sent to a recipient for more than a specified time period.

9. A method for managing messages comprising the steps of:

storing for one or more message recipients message managing information;

receiving from a message source a request for information about one of the recipients;

using the message management information to send to the requesting message source the requested information;

receiving from the message source a request to update the message managing information; and

updating the message managing information in response to the update request.

10. The method of claim 9, wherein the message managing information includes for each of the message recipients a date that a message was last sent to the recipient.

11. The method of claim 10, wherein the message managing information further includes for each of the message recipients a message timing interval.

12. The method of claim 10, wherein the step of receiving a request for information includes receiving a request for the date that a message was last sent to the recipient.

13. A method for managing messages comprising the steps of:

sending to a message storage system a request for information relating to whether a message can be sent to a message recipient;

receiving from the message storage system information in response to the request;

determining from the information received in response to the request whether to send a message to the message recipient; and

if a message can be sent to the recipient:

sending the message to the message recipient; and

sending to the message storage system a request to update the information relating to whether a message can be sent to the message recipient.

Figure 1

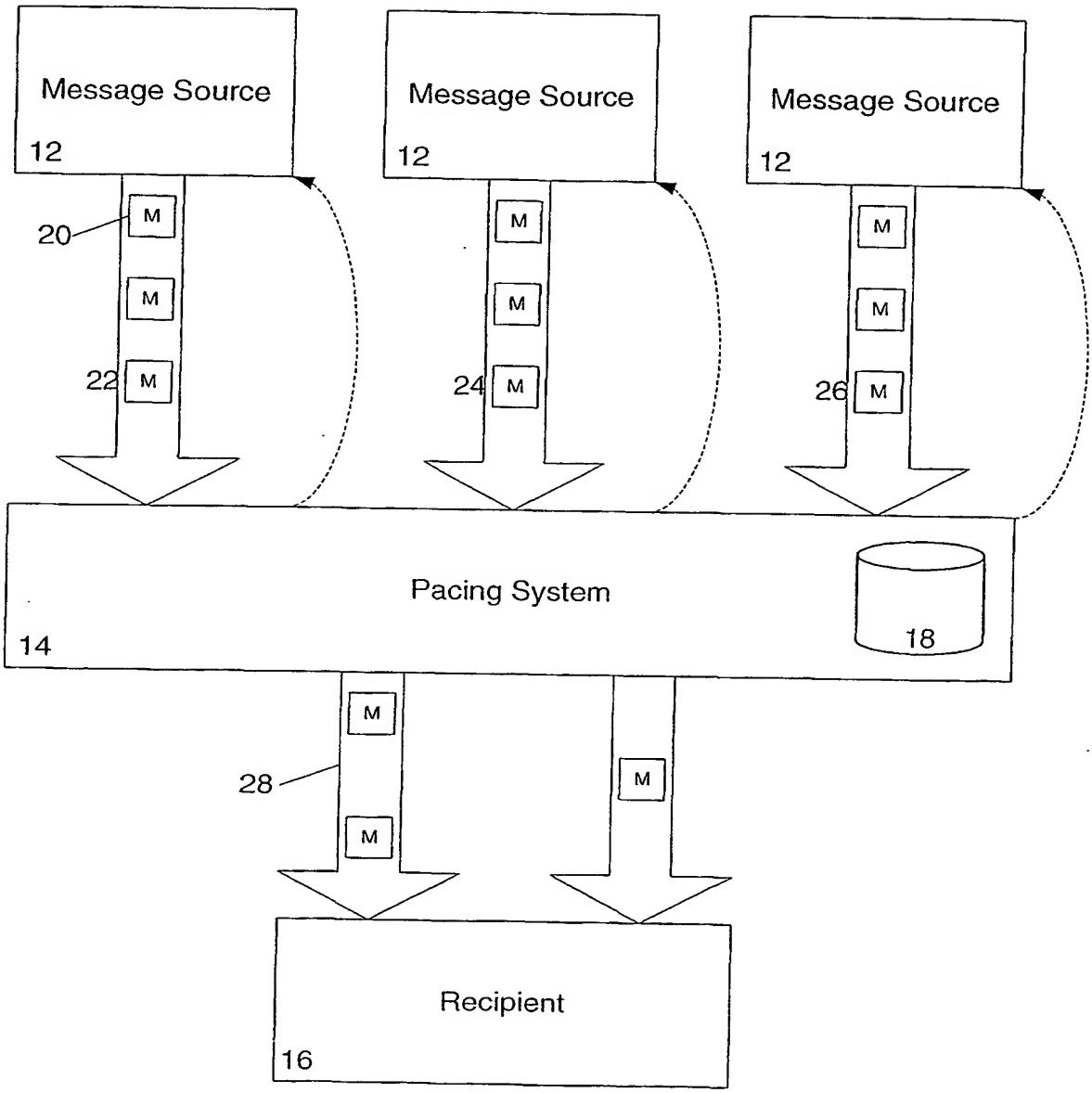

Message Source
12
Message Source
12
Message Source
12
20
M
M
M
22
M
24
M
M
M
26
M
M
M
Pacing System
14
18
M
M
28
M
Recipient
16

Figure 2

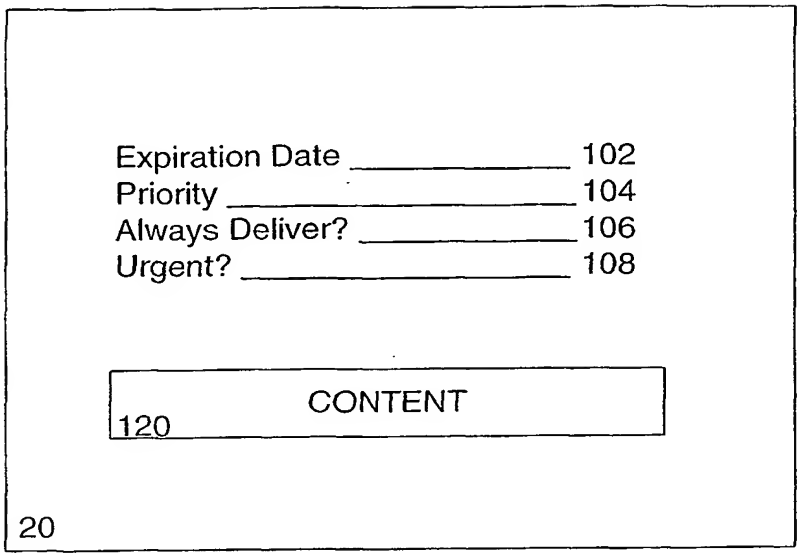

Expiration Date 102
Priority 104
Always Deliver? 106
Urgent? 108
CONTENT
120
20

Figure 3

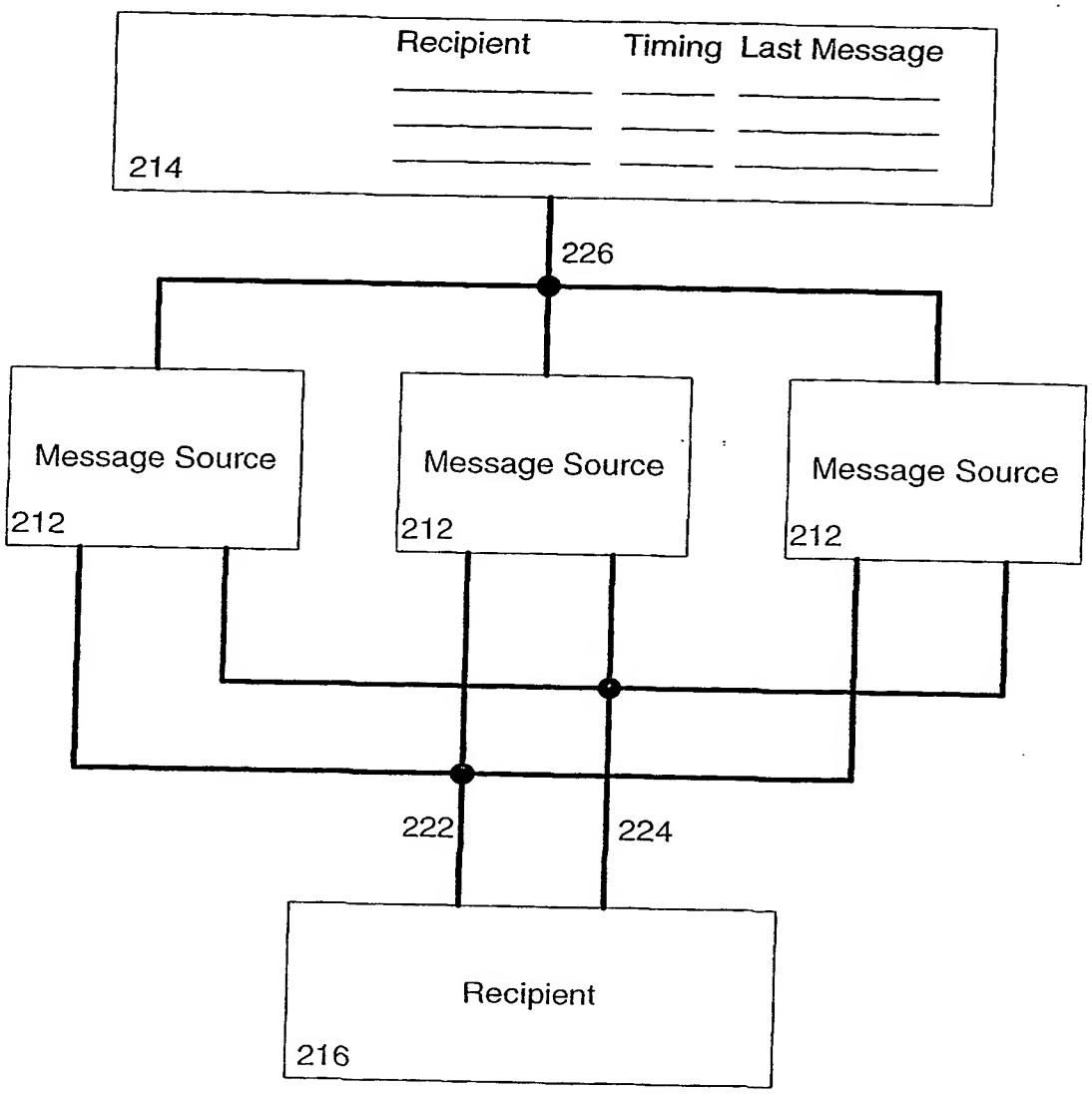

Recipient
Timing
Last Message
214
226
Message Source
212
Message Source
212
Message Source
212
222
224
Recipient
216

Figure 4

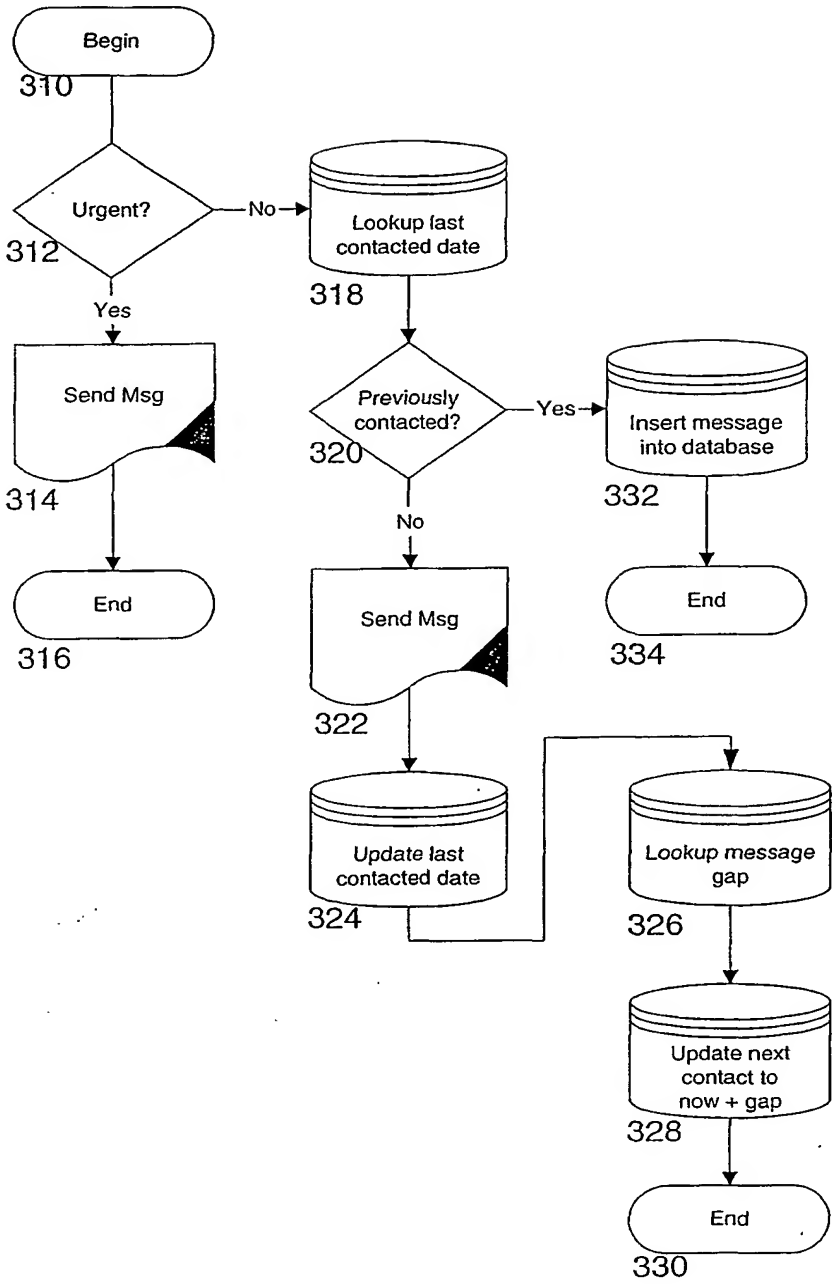

Begin
310
Urgent?
312
No
Yes
Lookup last contacted date
318
Send Msg
314
Previously contacted?
320
Yes
Insert message into database
332
No
End
316
Send Msg
322
End
334
Update last contacted date
324
Lookup message gap
326
Update next contact to now + gap
328
End
330

Figure 5

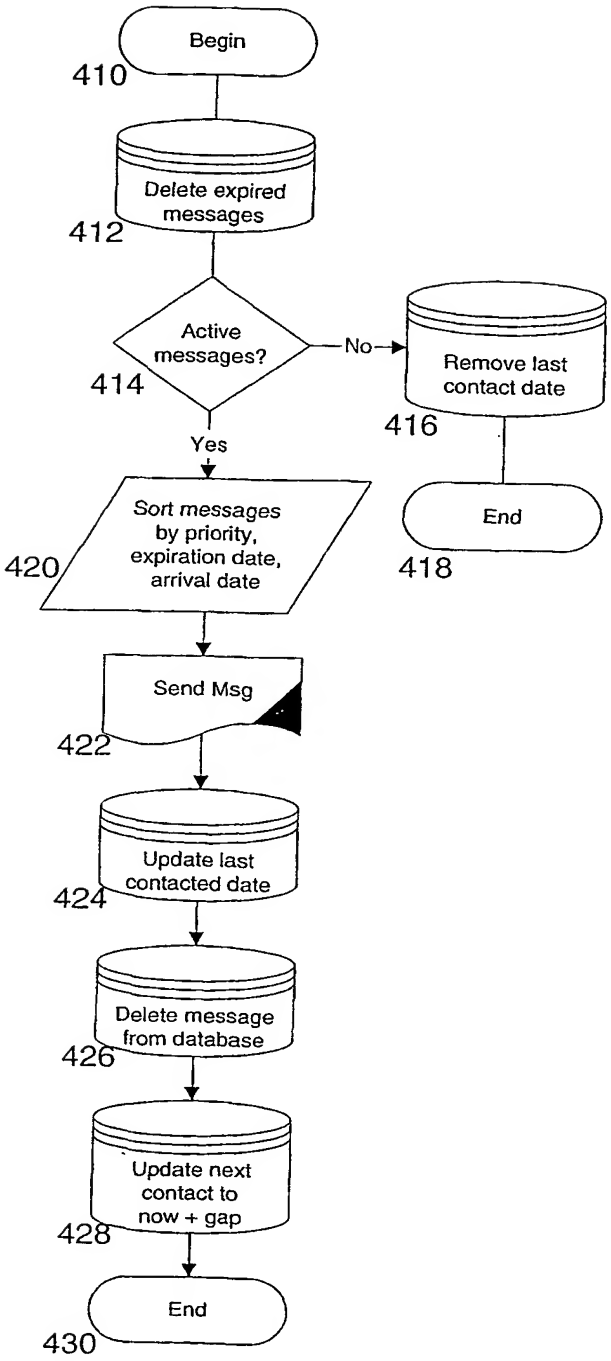

Begin
410
Delete expired messages
412
Active messages?
414
No
Remove last contact date
416
Yes
End
418
Sort messages by priority, expiration date, arrival date
420
Send Msg
422
Update last contacted date
424
Delete message from database
426
Update next contact to now + gap
428
End
430

Figure 6

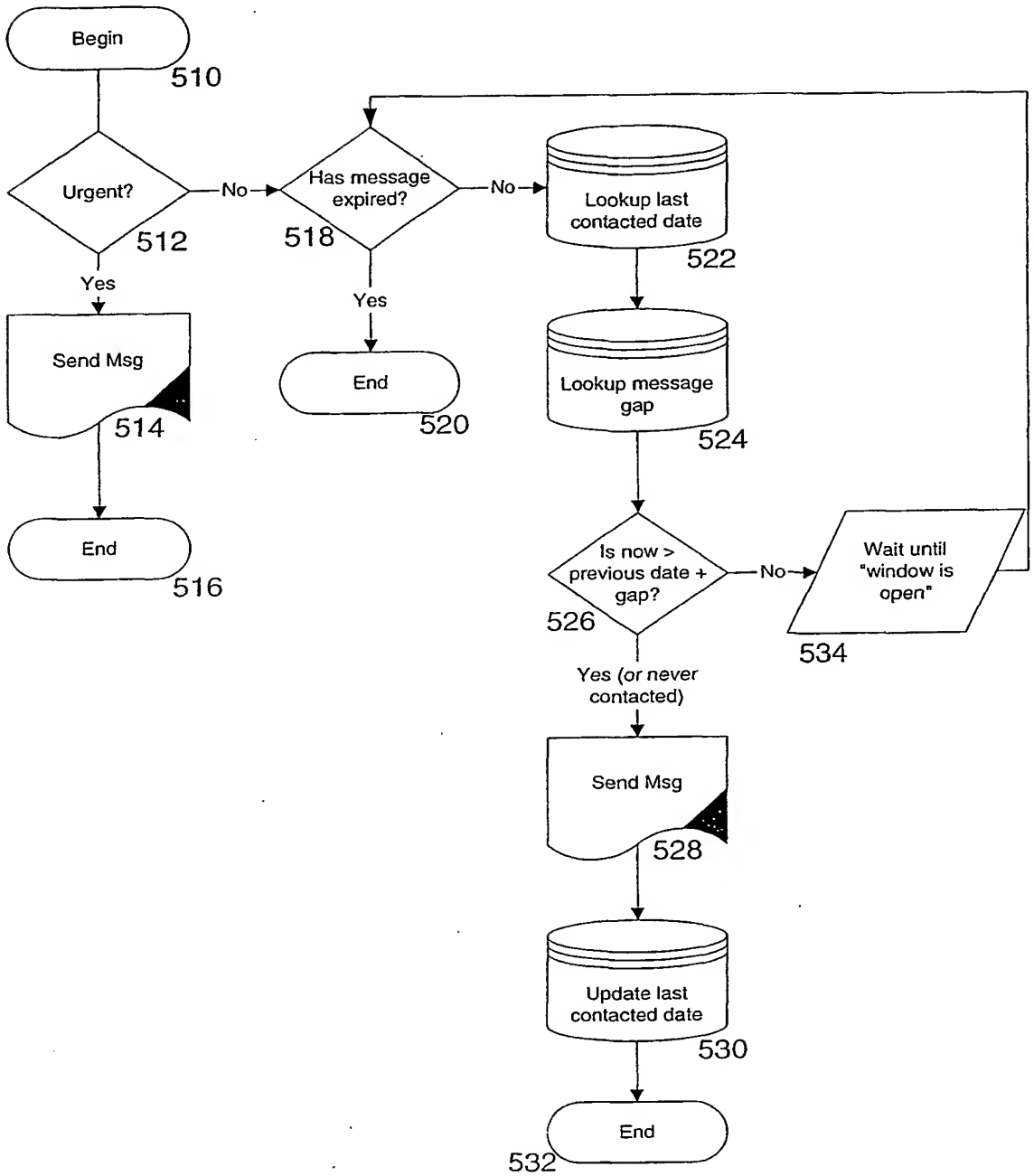
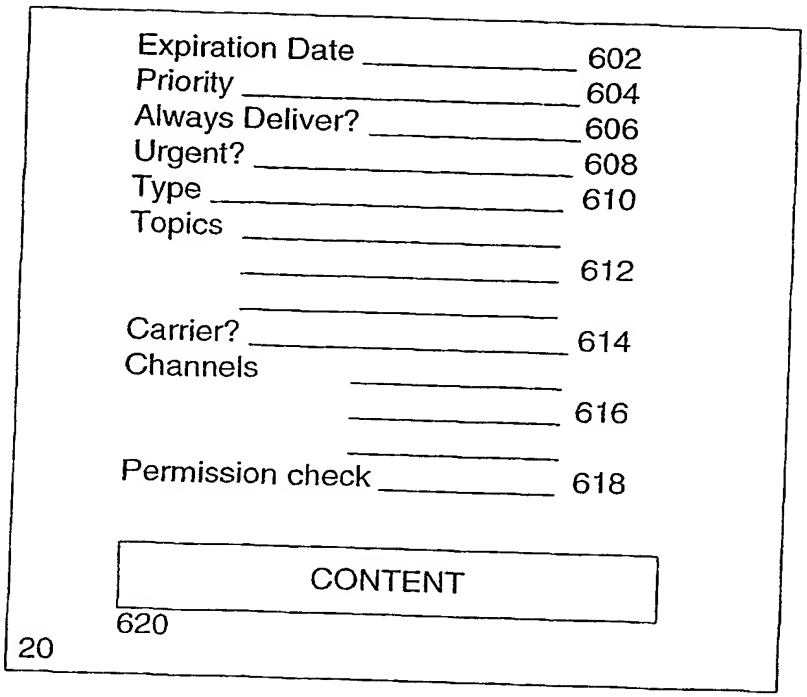

Begin
510
Urgent?
512
No
Has message expired?
518
No
Lookup last contacted date
522
Yes
Send Msg
514
End
516
Yes
End
520
Lookup message gap
524
Is now > previous date + gap?
526
No
Wait until "window is open"
534
Yes (or never contacted)
Send Msg
528
Update last contacted date
530
End
532

Figure 7


Expiration Date 602
Priority 604
Always Deliver? 606
Urgent? 608
Type 610
Topics 612
Carrier? 614
Channels 616
Permission check 618
CONTENT
620
20

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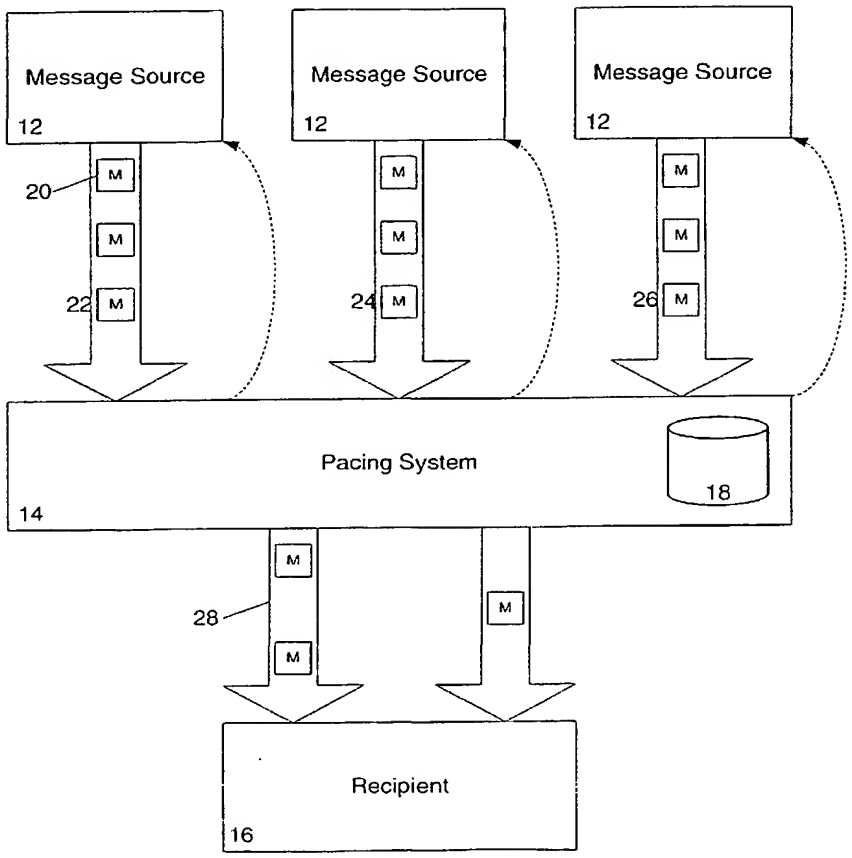
(54) Title: METHOD AND SYSTEM FOR MANAGING MESSAGE PACING



(57) Abstract: A system for managing message volume and timing, which permits messages from multiple sources to be spaced apart over time, with t he pacing controlled in part by the type or priority of the message. The system permits the volume of messages to be reduced by aggregating messages according to a set of rules and by discarding or delaying messages that are sufficiently similar and sent too close together. In addition, the system allows message sources to be notified when a recipient has not received a message within a designated time period. The system can be implemented as a centralized pacing system or through use of a data storage system accessible by the message sources.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04L G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 848 397 A (MARSH BRIAN D ET AL) 8 December 1998 (1998-12-08) abstract column 5, line 5 -column 14, line 64 ---	1-13
X	US 6 073 142 A (GEIGER FRED J ET AL) 6 June 2000 (2000-06-06) column 3, line 1 -column 4, line 54 column 6, line 14 -column 13, line 41 column 19, line 52 -column 20, line 39 claims 1,2 --- -/--	1-13

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

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European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Corcoran, P

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

International Application No
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